CLAIMS

1. A method for measuring incident light employing a semiconductor structure comprising an electrode film transmitting incident light and being applied with a gate voltage, and a diffusion layer for capturing electrons generated by the incident light, the diffusion layer being disposed under the electrode film with an insulating film provided therebetween, wherein the gate voltage is varied, the depth from the surface of the diffusion layer in which electrons are captured is varied, and a current indicating the quantity of the electrons is measured, thereby measuring wavelength and intensity of the incident light.

2. The method for measuring incident light according to claim 1, wherein the number of times of varying the gate voltage is set according to the type of the incident light.

3. A spectroscopic sensor comprising:

(a) a semiconductor substrate;

(b) a first diffusion layer provided on the semiconductor substrate;

(c) a second diffusion layer provided at a part of the first diffusion layer; and

(d) an electrode film provided on the first diffusion layer with an insulating film provided therebetween, the electrode film transmitting incident light and being applied with a

gate voltage, wherein

(e) the gate voltage is varied, the depth from the surface of the first diffusion layer in which electrons generated by the incident light are captured is varied so as to correspond to the gate voltage, and a current indicating the quantity of the electrons is measured, thereby measuring wavelength and intensity of the incident light.

4. The spectroscopic sensor according to claim 3, wherein the first diffusion layer comprises a p-type diffusion layer, the second diffusion layer comprises an n^+ diffusion layer, and the semiconductor substrate comprises an n-type semiconductor substrate.

5. The spectroscopic sensor according to claim 3, wherein the electrode film being applied with a gate voltage is a polycrystalline silicon film doped with an impurity.

6. A color image sensor without a color filter comprising a spectroscopic sensor array including the spectroscopic sensors according to claim 3 being disposed one dimensionally or two-dimensionally, wherein the spectroscopic sensor array is switched with a shift register formed with the spectroscopic sensor array to read signals, the depth for capturing electrons is varied to measure signals at each time, and the intensities of wavelengths of red, green, and blue are calculated from the signals to output color image signals.

7. The color image sensor without a color filter according to claim 6, further comprising a noise-eliminating circuit provided at an output part of the color image signals.

8. The color image sensor without a color filter according to claim 6, wherein the depth for capturing electrons is varied every 1/180 seconds.